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SCIENCE NEWS LETTER

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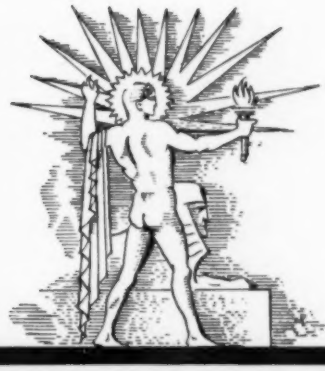
THE WEEKLY SUMMARY OF CURRENT SCIENCE •



July 29, 1939

Don't Sneeze

See page 72

A SCIENCE SERVICE PUBLICATION

Do You Know?

Seven German fleets fished for whales in the Antarctic last winter.

First white men to see the Grand Canyon were 12 Spaniards, 400 years ago.

The polar exploration ship Fram is preserved in Norway as a monument to the Norwegians who commanded it.

In constructing a stratosphere balloon every pound that can be saved in weight enables the balloon to rise about 15 additional feet.

In the Roman Empire, 230 cities in western Asia Minor struck their own coinage, an indication of their degree of self-government.

One hundred eighty-nine Indian tribes have voted for the Reorganization Act, which permits them to incorporate and function like business concerns.

Switzerland has fitted some frontier roads with circular traps, through which on instant notice steel girders can be raised to prevent tanks and artillery from moving in.

San Diego's Natural History Museum has a stone from the Antarctic, which was accidentally cracked open by a mechanic of the Byrd expedition, revealing a perfectly preserved leaf fossil inside.

The mosquito anopheles gambia, carrier of a serious form of malaria, was not known to exist in America until 1930; in 1938 it killed 10 per cent. of the people in some districts of Brazil.

QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER *are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.*

AERONAUTICS

How far can the "basket weave" airplane travel for bombing? p. 72.

ARCHAEOLOGY

What site is older than Egypt? p. 72.

Where will American scientists dig for archaeological treasure? p. 76.

ASTRONOMY

What is the brightest object in the sky? p. 74.

BIOLOGY

What discovery may lead to a practical way to manufacture fat from sugar? p. 79.

What hormone in bees has been found to affect vertebrates? p. 75.

BOTANY

How did botanists discover a chemical they will probably never isolate? p. 71.

DENTISTRY

How should you brush your teeth? p. 69.

What device will aid dentists of the future in forecasting the life of teeth? p. 69.

INVENTION

Why do tungsten lamps blacken and fail? p. 73.

MEDICINE

How many diseases have now been cured by sulfanilamide? p. 70.

MEDICINE—CHEMISTRY

What chemical difference has been found between cancer cells and normal cells? p. 67.

PHYSICS

What chemicals are found in viruses? p. 68.

PHYSIOLOGY

How many vitamins are parts of vitamin B? p. 75.

PSYCHOLOGY

How are babies "spoiled"? p. 73.

PUBLIC HEALTH

What chemical will probably make possible the control of African sleeping sickness? p. 71.

Wild flowers of Palestine and Transjordan are being studied by an American botanist.

A disease called red stele has destroyed acres of strawberries in the South and is now appearing in Connecticut.

Government chemists have produced fresh strawberry syrup that can be kept indefinitely—thus also providing a use for berries too ripe for shipping.

Many kinds of woodpeckers can "sound" trees, to locate insect colonies inside, so adeptly that the bird then proceeds to bore directly toward the food.

Only five per cent. of the improved highway mileage in the United States is more than two lanes wide.

Chemists says that the quality of taste of the sweetening agent saccharin is different from that of sugar.

Torches or other artificial lights were used in Spanish poultry houses as far back as 1803, so that birds would eat more in winter.

Only stalks of broom corn are used in broom making, but chemists find that the waste could yield oil, furfural, and material for non-breakable plastic.

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MEDICINE—CHEMISTRY

Find Chemical Difference Between Cancer and Normal Cell

Discovery by German Scientists That Amino Acids In Cancer Cells May Be "Right-Handed" Is Confirmed

HAILED as a promising new lead on the cancer problem, an important chemical difference between cancer cells and normal cells, reported by two Dutch scientists publishing in German journals, has been confirmed by Dr. E. Schroeder, working under the direction of Dr. Ellice McDonald at the Biochemical Research Foundation of the Franklin Institute.

Curiously the same effect was prognosticated in 1907 by an American physician, Dr. Margaret Cleaves, who at that time was treating cancer patients with enzymes in New York City. Digging into the medical literature brought to light this interesting fact.

The discovery, expected to speed the fight against cancer, is said to give a possible chemical approach to better understanding and treatment of this dread disease.

This new cancer research that has stirred the medical world comes from the University of Utrecht's Chemical Institute in Holland. Prof. F. Kögl, director, and Dr. H. Erxleben published their results in German medical and chemical journals, whence it filtered to the rest of the world, causing experimenters to interrupt their present problems to work on this more promising possibility.

In the Protein

The difference between the cancer cells and the normal cells is in the protein building blocks they contain. These building blocks, essential constituents of living matter, are known as amino acids. In the natural form, these acids might be called left-handed, because when a beam of polarized light is passed through them, they turn it to the left. In cancer cells, it has been discovered, the protein building blocks occur both in natural and unnatural forms, some of them being the natural left-handed variety and some the unnatural, right-handed kind which turn the polarized light to the right.

This is the first qualitative chemical difference that has been found between malignant and cancer cells, Prof. Carl Voegtlin, director of the U. S. National Cancer Institute, Washington, stated when interviewed. His laboratory is following up the discovery vigorously.

Discussing possible practical applications of the discovery, if confirmed, Prof. Voegtlin recalled that the great Michael Faraday was asked what practical results might follow his discovery of electromagnetism, now the basis of the electrical industry. At that time Faraday when asked what use was his discovery, replied: "What good is a baby?"

A possible practical result of the discovery, in the opinion of another cancer authority, would be the prevention of cancer by the use of enzymes, the substances which play a powerful role in the chemical changes going on in the body. A familiar enzyme is pepsin, the protein-digesting enzyme of the stomach.

The day of practical application of this nature is still in the future. Following confirmation of the discovery of the chemical differences between malignant and normal cells, such as Dr. Schroeder is about to report, scientists will have to find an enzyme that can turn the unnatural forms of the cancer's amino acids back to natural forms, or better still, perhaps one which can keep all the amino acids in the body from turning into the unnatural forms. These ideas, of course, are purely speculative. There is no evidence yet that the difference just found between cancer cells and normal cells is the cause of cancer—it may be a difference that arises after something else has caused the cancer to start its uncontrolled growth.

Dr. Cleaves, the American physician, was working on this idea in 1907, actually using an enzyme, trypsin, from the pancreas, in treatment of cancer. Her idea was that in certain disease conditions such as cancer, the proteins of the tissues were susceptible to trypsin's action because of "their special configuration." While she evidently did not go any deeper into the chemical aspects, the difference just discovered between cancer and normal cells is a difference

MEASURES A WHISTLE

This surface indicator, being operated by J. A. Sams, of the General Electric Works Laboratory, who developed it, is so sensitive that it will indicate the thickness of a fingerprint on a piece of smooth glass as its minute irregularities are felt out by a sapphire-pointed stylus. The device is used to determine the smoothness of metal or painted surfaces. Mr. Sams is measuring the vibrations caused by a whistle.

in the configuration or pattern of the building blocks of the cell protein. With the greater knowledge of body chemistry that has accumulated in the past 32 years, scientists are in better position to test the role of enzymes in cancer.

Dr. Cleaves died in 1917, without the knowledge that over 20 years later scientists would be attacking the cancer problem from the enzyme angle on which she worked.

Science News Letter, July 29, 1939

MEDICINE—CHEMISTRY

British Fail to Confirm Cancer Cell Discovery

HARD on the heels of news that an important chemical difference between cancer cells and normal cells had been found, comes a British report that the finding could not be confirmed.

At the Imperial College and the Research Institute of the Royal Cancer Hospital (Free) in London, scientists were unable to find the difference between the cancer cells and normal cells, observed by Prof. K. Kögl and Dr. H. Erxleben, of the University of Utrecht. Reporting to *Nature* (July 8), Drs. A. C. Chibnall, M. W. Rees, G. R. Tristram, and E. F. Williams, of Imperial College, and Dr. E. Boyland, of the Royal Cancer Hospital, state:

"These preliminary results are not in agreement with those of Kögl and Erxleben, and show the need for a more extended investigation."

The Dutch discoverers, defending their findings (*Nature,* July 15), state that a difference in chemical methods accounts for the fact that Prof. Chibnall and his associates failed to confirm the Dutch work. The English scientists, they claim, used a test which, while good for detecting the natural form of the acid, is not apparently able to detect the change in this acid to the unnatural form.

Science News Letter, July 29, 1939

Airplane pilots are tested for physical fitness every 90 days.

Women in ancient Egypt carried basket loads on their heads.

The old game of jackstones has gone modern with plastic jacks in gay colors.

There are about 90,000 Diesel-powered vehicles in use, only about 3,000 of them registered in the United States.

A bicolored ground snake found recently at Grand Canyon is believed new to science and unknown elsewhere.

PHYSICS

Blood's Oxygen Carrier Studied With Spectroscope

First Studies of Hemoglobin Within Its Natural Environment of Red Blood Cells Reported to Meeting

THE FIRST studies ever made of hemoglobin, the red, oxygen-carrying material of the blood, within its natural environment of the red blood cells themselves, were reported to the Massachusetts Institute of Technology spectroscopy conference at Cambridge by Dr. David L. Drabkin of the University of Pennsylvania.

Previous spectroscopic researches in this knotty but highly significant field have been limited to investigations of concentrated solutions of the pigment, prepared by actual destruction of the red cells themselves. Thus much of our knowledge has been drawn from studies not of the substances in their natural environment but of their solutions obtained by extraction, a procedure possibly risking chemical change.

Dr. Drabkin dealt with a rather complicated turbid suspension of the red blood cells which gave a distorted picture requiring interpretation. His results constitute the first accurate deductions ever made on biological material. Preliminary studies indicate that the spectra of hemoglobin and its derivatives are the same within the blood cells as those obtained extracellularly.

The method has already found an additional application, in facilitating accurate determination of hydrogen ion concentration within the red blood cells. This is done by intracellularly converting the hemoglobin to methemoglobin, its oxidized form, and using the well known indicator properties of this latter compound.

Dr. Drabkin said that this unique method of using the main cellular constituent to determine reactions within the cell appears "most promising." Heretofore such methods as puncturing the cell with a micro-needle, which injures the cell, have been used.

Dr. Drabkin also reported progress in a spectroscopic study of protein denaturation which may throw considerable light on the structure of the complex protein molecule. Urea, he found, may play an important role in the denaturation process, for whereas hemoglobin is denatured no more rapidly in alkali than in concentrated urea solution, the presence of both reagents speeds the process some sixty-fold.

Science News Letter, July 29, 1939

Study Make-Up of Virus

THE first spectroscopic analysis ever made of viruses, ultra-microscopic disease-producing entities, and their constituent proteins and nucleic acids, has been made by Dr. George I. Lavin of the Rockefeller Institute for Medical Research.

Dr. Lavin investigated three plant viruses—the classic tobacco mosaic virus, latent mosaic virus and tobacco ringspot virus, all of them crystallized in the pioneer researches in this field by Dr. Wendell M. Stanley and Dr. Hubert S. Loring of Princeton.

Crux of his technique, as explained to the spectroscopy conference, was the use of a continuous light source, in preference to the more usual source, and fractionation or splitting of the complex biological substances with which he was dealing, a procedure which may well revolutionize accepted spectroscopic methods of attacking intricate medical and biological problems.

Nucleic acid is apparently a rather prominent constituent of some viruses at least, for Dr. Lavin found it in all three of the plant viruses with a particularly high concentration in the tobacco ringspot. The presence of indoleacetic acid was also indicated.

That the amino acids which go to make up a protein may at times be hitched together in a very peculiar way was indicated by Dr. Lavin's study of papain, a protein-splitting enzyme, in which he was unable to find the amino acid, tyrosine, until after the enzyme had been hydrolized by Dr. J. S. Fruton.

He has also used the spectrograph to analyze urine, photographic fractions prepared by Drs. K. Dobriner and C. P. Rhoads so precisely that he was able to identify a number of physiologically im-

portant materials. Two years ago Dr. Lavin made the first spectroscopic analysis ever done of an enzyme, pepsin.

In all, Dr. Lavin has investigated proteins both containing and deficient in aromatic amino acids and with varying concentrations of nucleic acid, problems which are virtually hopeless chemically. He has also examined the protein fraction of pneumococci, the causative agents of pneumonia.

Science News Letter, July 29, 1939

Predicts Sun Discoveries

IDENTIFICATION of three previously undetected molecules of matter, which can probably soon be found in the sun, was announced by Dr. H. G. Howell of University College, Southampton, England.

They are the oxides of iron, nickel and cobalt, none of whose spectra has ever been reported heretofore.

If found in the sun, as Dr. Howell predicts, these will bring to 30 the number of molecules known to exist there and in all probability in all stars of a similar type. Several other molecular combinations thought most likely to be present have not yet been found, partly due to lack of laboratory data concerning them and partly because the properties of these molecules make detection exceptionally difficult.

The research was conducted with the spectrograph which analyzes the light given off by the molecules under examination. In investigating atoms, the strength of the spectral lines indicates their relative abundance but this phenomenon is not sufficiently trustworthy in the case of molecules, due to their peculiar properties.

Science News Letter, July 29, 1939

DENTISTRY

New Way of Using Toothbrush Introduced To Dentists

Scientist Says Back-and-Forth Brushing and Rotary Method Are Equally Harmful; Should Imitate Chewing

A NEW way of brushing teeth was introduced by Dr. T. Sidney Smith, of San Francisco, to the American Dental Association meeting in Milwaukee. Dr. Smith also stressed the importance of toothbrushing and of cooperation between dentist and patient in caring for the teeth.

"There is nothing more helpful in the daily care of the teeth and their investing tissues than the toothbrush when properly used," Dr. Smith declared. "At the same time, nothing has been so destructive of tooth structure by abrasion and has caused as much recession of investing tissues as stiff, ill-shaped brushes."

The child's way of brushing teeth horizontally back and forth and the rotary method are both harmful, according to Dr. Smith, because they cut grooves into the teeth in time. Slightly better, but not good enough, is the newer method of brushing away from the gums. This does no harm but neither does it do any good in Dr. Smith's opinion. He advises a method that follows the direction of the food in chewing.

"The main strokes of the bristles are guided upward over the upper teeth and gums and downward over the lower; this is nature's way of cleansing and stimulating the tissues," Dr. Smith explained.

The brush he recommends is the plain old-fashioned one, of medium size, with small tufts of fine bristles arranged in four parallel rows and trimmed to an even length. Gentleness and time should be used, rather than force and speed, he indicated. He suggested that teeth, like dishes, should be cleaned after every use, but since this may not be practical, the bedtime cleansing is especially important because, he says, bacteria increase more rapidly in the mouth during sleep.

Science News Letter, July 29, 1939

Forecasting Life of Teeth

A MEASURING stick by which the longevity and future health of one's teeth can be forecast was proposed by Dr. Arthur L. Jensen, of the University of California.

Dr. Jensen's plan would allow dentists of the future, he believes, to answer the following questions: "What are your chances of outliving your teeth? Can your teeth last through life? Must you go through life with tooth troubles? How long will your teeth last? What can be done to help you maintain a healthy mouth?"

The plan is based on individual measurement of the capacity of each tooth in the mouth and the tooth damage each person has sustained. From this is computed a "dental health capacity index" for the mouth as a whole. Dentists would pool information on many thousands of patients of the same age group who had the same kind of tooth troubles. In the course of years, a definite pattern of tooth history could be secured from which a person could know years in advance just what to expect.

Science News Letter, July 29, 1939

PHYSICS

New Device Traps Current in Lightning Bolts

ATOP the 42-story tower of the University of Pittsburgh's Cathedral of Learning is a spinning wheel that traps bolts of lightning, studies their electrical characteristics and then discharges them harmlessly through lightning arrestors.

The device spins at 3,400 revolutions a minute. In continuous operation since June 3, it turned over its 210,000,000th revolution July 15. In a normal lightning season of 200 days it will come close to a billion revolutions.

The device that willingly and purposely awaits the direct hits of lightning is called the fulchronograph. Designed

LIGHTNING TRAP

This device on the top of the 42-story tower of the University of Pittsburgh traps bolts of lightning and records their electrical characteristics.

by Charles F. Wagner and Gilbert D. McCann, Westinghouse engineers, the device is essentially a motor and a slotted aluminum wheel filled with laminated permanent magnet steel, projecting like fins from each side of the wheel and rotating through two coils which carry the total surge current from the lightning stroke being measured.

As the small fins pass between the magnetic field of the coils they are magnetized in proportion to the amount of current that is carried by the lightning stroke in time intervals as brief as 40 millionths of a second.

The fulchronograph gives a schematic picture of the wave shape and surges in a single lightning stroke. This is compared with the wave shape and surges created by artificial lightning bolts in the laboratory, and can be used to improve the protection of exposed power circuits.

First lightning stroke actually measured by the new device was found to last one-sixtieth of a second and showed a maximum current of 21,000 amperes, or enough to light 40,000 ordinary light bulbs.

Science News Letter, July 29, 1939

MEDICINE

Sulfanilamide, Wonder Drug, Now Cures 33 Diseases

Only in the Battle Against Common Colds and Influenza Are the New Chemical Remedies Apparently Valueless

THIRTY-THREE different disease conditions may now be cured by the new chemical remedies of the Protonsil-sulfanilamide-sulfapyridine group. In addition, these chemicals may be effective in preventing some of the ailments. Only in the treatment of colds and influenza are they apparently valueless.

The whole story of these amazing, new chemical remedies, what they can do, how they should be used, and their dangers is told for the first time by Drs. Perrin H. Long and Eleanor A. Bliss, of the Johns Hopkins Medical School, in a book just published for medical scientists by Macmillan. Drs. Long and Bliss were among the first to use these wonder-working remedies in the United States.

There are now, according to this book, eight drugs in the sulfanilamide group. They are: sulfanilamide itself, known also by the trade names of Prontylin, Streptocide, Prontosil Album and Lysococcine; Prontosil, also called Prontosil Flavum; Neoprontosil or Prontosil Soluble; benzyl sulfanilamide, also called Septazine and Proseptasine; sulfanilyl sulfanilamide, with the trade name of Disulon; sulfanilyl dimethyl sulfanilamide, called Uliron and Uleron; sulfapyridine, with the trade names of M & B 693 and Dagenan; and another compound known only by its chemical name 4,4′diaminodiphenylsulfone.

Sickness caused by two kinds of streptococcus germs, by the gonococcus, the meningococcus, and the pneumococcus has been successfully treated by these remedies. Recoveries from undulant fever, chancroid, typhoid fever, urinary tract infections, gas gangrene, chronic ulcerative colitis, trachoma, malaria, and the skin diseases, pemphigus and lupus erythematosus, have also been reported following treatment with one or another of these chemicals. In malaria, typhoid fever and undulant fever, the value of the chemicals has not yet been conclusively proved. Not many cases have been treated. Some doctors report good results and others poor results in these conditions.

Sulfanilamide, now used successfully as a remedy for childbed fever and gas gangrene, may become even more of a life-saver through use as a preventive of these serious illnesses. Drs. Long and Bliss believe any patient who suffers an injury which might result in the development of gas gangrene should be given prophylactic doses of the drug as soon as possible. Sulfanilamide also shows some promise of helping in the fight against rheumatic fever, the childhood ailment which affects the heart and causes many deaths among young people.

"Probably the greatest single instance of the misuse of sulfanilamide is in the treatment of the common cold," Drs. Long and Bliss declare. They explain that since colds and influenza are due to viruses, not bacteria, "there is little reason to believe that sulfanilamide will be of any value in the treatment of these diseases, and we strongly advise against its use in these infections."

So far, all that is definitely known about how sulfanilamide achieves its cures is that this and related chemicals inhibit or check the growth of susceptible germs. A number of theories explaining the action of the chemicals in more detail have been proposed but, in the opinion of Drs. Long and Bliss, none of the theories adequately explains the action of the drugs.

Sulfanilamide and related compounds are not without danger. Stones in the kidneys are the most recently reported ill effect to follow one of these drugs, sulfapyridine. Few deaths, however, have followed the use of these drugs, except for the 76 or more which followed the tragic use of Elixir of Sulfanilamide Massengill. In these it was not the sulfanilamide but the deadly diethylene glycol, used as a solvent, which caused the fatalities. If proper precautions are taken in caring for patients receiving sulfanilamide or related drugs, serious ill effects will be noticed at their beginning, Drs. Long and Bliss state, and measures can be taken to lessen their severity and prevent a fatal outcome.

Science News Letter, July 29, 1939

ENGINEERING

Gas Turbines Practical In Generating Power

AN OLD DREAM of getting useful power from the direct expansion of burning gases without the bother of cylinders and pistons, fuel injection, and even cooling water is coming true practically. For over a century the turbine propelled by gas has been discussed; now it is coming into power-generating use.

Over a dozen gas turbines are now in actual use or being built here and in Europe. Power engineers are eyeing them with great interest and anticipation.

Just as steam in a steam turbine drives steel blades on a rotating shaft, delivering power without the reciprocating motion, so hot gas whirls the blades of the gas turbine.

It will not outmode immediately steam turbines, steam engines or Diesel and other internal combustion engines. But for special uses the gas turbine has great promise.

Because it needs no water for cooling (steam plants often need a thousand tons of cooling water per ton of coal burned) it is ideally fitted for operation away from rivers in arid areas, such as south-

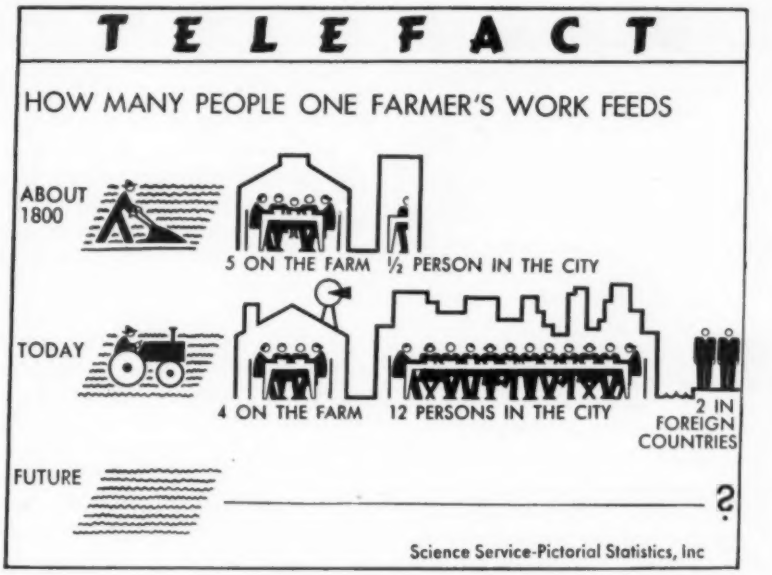
western oil fields where waste gas is plentiful and water scarce.

For Neuchatel, Switzerland, a large gas turbine is being built for emergency use. It will be installed in a rock tunnel where bombs cannot hit it. Its small size and use of air for cooling make this practical. A 2000 horsepower gas turbine locomotive only 60 feet long is being constructed for the Swiss Federal Railroad.

In this country gas turbines have been in use for over two years running on waste gases from oil refining with such success that more have been ordered for such use.

Dr. Adolph Meyer of Brown Boveri Co., Baden, Switzerland, has been the leader in gas turbine design and production, while Allis Chalmers Mfg Co., Milwaukee, is building them in America.

Science News Letter, July 29, 1939



PUBLIC HEALTH

Control of African Sleeping Sickness Promised

AFRICAN sleeping sickness, dreaded plague of tropical Africa, is rapidly being conquered by the chemical remedy, tryparsamide, and will probably soon be under "satisfactory control." This progress and the encouraging outlook for the future is reported (*Science,* July 14) by Dr. Louise Pearce, of the Rockefeller Institute for Medical Research at Princeton, N. J. Dr. Pearce was the first to show the beneficial effects of this drug on sleeping sickness cases in the Belgian Congo.

African sleeping sickness is caused by a germ called the trypanosome which is carried by the tsetse fly. It is a highly fatal disease, not to be confused with the encephalitis popularly called "sleeping sickness" in the United States and European countries.

The great value of tryparsamide over other drugs used to treat the ailment, Dr. Pearce points out, is that tryparsamide is effective as a cure in both early and late phases of the infection. Since it has been used in mass treatment the number of sleeping sickness cases has dropped markedly in various African colonies where efforts are being made to stamp out this age-old plague.

Other public health measures, directed against the tsetse fly and against uncontrolled movements and concentration of populations, are also playing a part in bringing the disease under control, but chief credit, Dr. Pearce indicates, belongs to the drug which cures patients and cuts down human sources of infection.

Science News Letter, July 29, 1939

BOTANY

Fleeting Chemical Discovered Necessary in Plant's Life

Finding That Wheat Seedlings Continue To Use CO_2 After Darkness Showed Intermediate Chemical Is at Work

DISCOVERY of a chemical that allows the green plant to inhale waste carbon dioxide out of the air was announced by the Smithsonian Institution.

This hitherto unsuspected substance is a go-between for carbon dioxide and chlorophyll, green coloring matter of plants. It seizes a molecule of carbon dioxide and delivers it to the chlorophyll. It is therefore one of the most important substances on earth as without it sunshine energy could not be trapped in vegetation.

Dr. E. D. McAlister, biophysicist of the Smithsonian Institution, was the discoverer during extremely delicate measuring of the amounts of carbon dioxide used by wheat seedlings. He found that plants continued to use carbon dioxide for a short interval after they had been plunged into darkness, which was contrary to conventional ideas about photosynthesis. He concluded that some intermediate chemical was playing an essential role.

The existence of the new chemical basic to life was thus demonstrated, but so fleeting is its existence that Dr. McAlister does not believe that it will ever be possible to isolate any of the stuff itself.

Chlorophyll, by the process called photosynthesis, enables the plant to use sun energy to manufacture out of water from the soil and carbon dioxide from the air the various hydrocarbons, such as cellulose, starch, etc., used by men and animals for food and other purposes. Coal and oil contain the sunshine of past ages trapped in this way. Our breathing and the burning of fire use oxygen and pour out carbon dioxide into the air, while photosynthesis manufactures oxygen for the air. Thus the new chemical believed essential to photosynthesis is one of the important links in the energy cycle of all life here on earth.

Science News Letter, July 29, 1939

●RADIO

Homer N. Calver, secretary of board of American Museum of Health, will be the guest scientist on "Adventures in Science" with Watson Davis, director of Science Service, over the coast to coast network of the Columbia Broadcasting System, Monday, August 7, 5:45 EDST, 4:45 EST, 3:45 CST, 2:45 MST, 1:45 PST. Listen in on your local station. Listen in each Monday.

AERONAUTICS

"Basket Weave" Airplane In Large Scale Production

GREAT BRITAIN'S "basket weave" bomber — the Vickers Wellington bomber which is built on the radically new geodetic principle of aircraft construction, and which can carry an unusually heavy load for its weight or travel an unusual distance—is now in large scale production in a factory at Brooklands, the Society of British Aircraft Constructors reports.

By using a "basket weave" structure unusual lightness and strength are achieved. Three single-motored Vickers Wellesley bombers of similar construction, but an earlier type, hold the world's distance record of more than 7,100 miles. The twin-engined Wellington could travel 10,000 miles nonstop if specially prepared for a long journey, the Society quotes the Vickers people as saying.

The Wellington has a range of 3,142 miles in still air with full military load. It could bomb an objective more than 1200 miles away and return and still have an allowance for bad weather or ducking enemy fighting planes. Top speed is 265 miles an hour.

Production of small "basket weave" planes has just begun in the United States.

Science News Letter, July 29, 1939

PUBLIC HEALTH

High Infant Mortality Challenges Educators

THE high infant deathrate in the United States may be looked on as a challenge to those engaged in educating the layman or conveying information to him on matters affecting health. If present knowledge of infant care were enthusiastically and competently applied, the deathrate of infants under one year of age could be cut to 25 per 1,000 live births, it is stated by competent authorities.

The helplessness of infants which makes them so appealing to most adults makes the infants completely dependent for their very survival on the care of their mothers or other interested persons. But though the maternal instinct to care for the infant may awaken spontaneously, the experience of childbirth, by itself, does not bring the mother the knowledge she needs to give her baby the best possible chance for surviving the hazards of its first year of life.

"This knowledge," the Metropolitan Life Insurance Company's health experts say, "the mother can gain only from sources available to her from public or private agencies that make it their business to disseminate the latest advances in prenatal and neonatal care."

The variations in infant mortality in different parts of the country, according to these authorities, reflect the extent to which such information regarding care of the mother before the baby's birth and care of the infant himself is dispersed among the people at large.

In New Mexico, for example, the infant mortality is fully three times as great as in Oregon, indicating probably that mothers in New Mexico have not nearly the opportunity to learn about child care that Oregon mothers have. New Mexico has the poorest infant mortality and Oregon the best in the nation. But even Oregon is fully 30 per cent higher in its infant mortality rate than New Zealand.

Not only do some states have much higher infant deathrates than others, but those with the highest rates and greatest opportunity for improvement have not shown the greatest improvements, comparison of statistics showed.

Science News Letter, July 29, 1939

PHYSIOLOGY

Anti-Blood Clotting Stuff Depends on Blood Unknown

HEPARIN, recently hailed as an anti-blood clotting substance that might prove valuable in preventing fatal blood clots which occasionally follow surgical operations, cannot by itself prevent the clotting of blood, it appears from the latest report on the subject. Heparin's anti-clotting activity is due to the presence with it of as yet undiscovered substances in blood serum and plasma, Dr. Tage Astrup, of the Carlsberg Foundation, Copenhagen, concludes from investigations (*Science*, July 14).

Science News Letter, July 29, 1939

PUBLIC HEALTH—BOTANY

Hay Fever Victims' Menace Shed Freely by Ragweed

See Front Cover

GIANT RAGWEED is one of the most abundant and widely distributed of American weeds—as millions of hay fever sufferers can tearfully testify.

The polleny picture on the front cover of this week's SCIENCE NEWS LETTER was snapped by Dr. R. P. Wodehouse of Yonkers, N. Y.

Science News Letter, July 29, 1939

IN SCIEN

ARCHAEOLOGY

St. Paul's Homeland Outranks Egypt in Age

CILICIA, homeland of the Bible's greatest traveler, St. Paul, is coming into the news.

But it is not the Cilicia of Paul's boyhood that is being rediscovered. British archaeologists are digging deeper into history and bringing to light settlements built 3,600 years and more before Paul was born "Saul" of Tarsus.

In surprise, they report that civilization was advanced in this southern corner of Asia Minor when Crete, Egypt, and Babylonia were in their infancy.

A mound 70 feet high at Mersin, in Cilicia, not many miles from Tarsus, is where the University of Liverpool expedition is probing layer upon layer of ruins. Having dug through 16 separate levels of human occupation, they have reached well preserved remains of a fortified city. It stood about 3,600 years before Christ. Its people built skillfully with mud brick. They plastered their walls, and roofed their houses with timber from the mountain slopes. Defense problems absorbed them. Some rooms excavated seem to be quarters of married soldiers, judging by domestic equipment and clay sling shots and the provision for fighting through slits in the walls.

The city lies buried so deep that a Hittite fortress of 1300 B. C. left its ruins fully 20 feet higher in the mound.

And still the expedition has cut its way only through the upper half of the mound. To satisfy curiosity, soundings have been made into lower levels, and the whole mound is found to be an archaeological "cake" of layered remains.

As early as 6000 B. C. Stone Age people settled at this site. These pioneers were in the New Stone Age of cultural history, in which men discovered how to polish stone tools and became farmers and pottery makers.

Paul, who doubtless saw this mound, could never have dreamed of its story. It is taking all the technical resources and scientific knowledge of a scientific age to give back to various countries of the world their whole record of beginnings and progress.

Science News Letter, July 29, 1939

NE FIELDS

INVENTION

New Incandescent Lamp Has Extremely Long Life

A NEW incandescent lamp having remarkably high efficiency and extremely long life has just been patented in the United States by two Dutch scientists, Johannes A. M. van Liempt and Willem Elenbaas of Eindhoven, Netherlands.

The new lamp circumvents the troubles of existing tungsten filament lights which develop hot spots in the filament, evaporate off the tungsten and thus burn out even though much of the filament is still left after the break that ends the bulb's life.

Ordinary bulbs pass electric current through the filament wire which glows to incandescence. The narrowest parts of the filament are hotter than the other parts and tend to evaporate off the metal more rapidly. While filaments are made as uniform in size as possible variations exist which promote metallic evaporation that blackens the bulb and finally breaks the filament.

In the new bulb the glowing incandescent part is a small, hollow body of refractory material, like tantalum chloride or boron nitride, whose melting point is above 5,432 degrees Fahrenheit. Within the hollow space an electrical discharge is created which indirectly heats the walls to incandescence.

By this system a much more uniform heating is obtained, claims the patent (No. 2,164,183). With the new lamp—assigned to the General Electric Company—it is possible to get either long life with the same electrical load on the lamp, or get much brighter illumination for equal life with present lamps. The bulbs must be filled with an inert gas such as nitrogen, argon, krypton or xenon.

Science News Letter, July 29, 1939

GENERAL SCIENCE

Survey Contributions Of Amateur Scientists

DISCOVERIES and research contributions in science made by non-professional scientists are being surveyed for the Philadelphia area by a newly established Committee on Education and Participation in Science, operating under the supervision of the American Philosophical Society, with funds provided by the Carnegie Corporation of New York.

Chairman of the new committee is Dr. Edwin G. Conklin, emeritus professor of biology at Princeton University, executive vice president of the American Philosophical Society, and president of Science Service.

Choice of the Philadelphia region as the "sample" area to be studied for contributions of amateur investigators is regarded by professional scientists as a happy one. In colonial and early national days, Philadelphia was not only the metropolis of the country but the scientific capital as well.

An outstanding leader among the brilliant scientific amateurs of those times was Benjamin Franklin himself, founder of the American Philosophical Society, whose scientific and inventive activities ranged all the way from proving the electrical nature of lightning and suggesting the basis of modern weather forecasting to the invention of an improved heating stove.

The survey will be conducted by an executive staff of scientific consultants. It will study educational programs already in progress in many institutions and will also determine the contribution made by about 180 amateur organizations in the Philadelphia area, including astronomers, telescope makers, natural history and hiking clubs, photographic groups and others. Special emphasis will be placed on the participation of persons in discussion forums, laboratory courses, museum tours and field trips.

Science News Letter, July 29, 1939

BIOLOGY

New Artificial Cell Works Like Living One

AN ARTIFICIAL cell that duplicates the ability of living membranes to allow passage of either water or fat solutions was reported to the American Chemical Society's Sixteenth Colloid Symposium at Stanford University by Prof. Harry N. Holmes of Oberlin College.

Giving hope of better understanding of how the living cell operates, the working model is a bag made of 1% lecithin, fat-like substance found in egg yolk, brain and nerves, dissolved in collodion (cellulose nitrate).

Science News Letter, July 29, 1939

PSYCHOLOGY

Babies Spoiled by Neglect, Never by Too Much Love

MOTHERS, and grandmothers too, can stop worrying about spoiling the baby.

Reassurance comes from a psychiatrist who has tried to salvage many a spoiled child. Never was a child spoiled through too much affection, too much attention, too much fondling, declares Dr. Lauretta Bender, senior psychiatrist in charge of the children's observation ward, Bellevue Hospital (*American Journal of Orthopsychiatry,* July).

Children, this expert has found, are spoiled by neglect and lack of love and by self-centered parents who "indulge themselves by giving the child attention when it pleases them and holding it back when it displeases them . . . who admire the child not for its own sake but for theirs."

Psychopathic personalities, those distorted personalities so common among criminals and delinquents and generally among social misfits are built by lack of parental love.

"Children who are raised in institutions or have no parents, or who lose both parents early, develop into what we call psychopathic personalities," Dr. Bender said.

"They remain infantile, they satisfy their immediate impulse, throw temper tantrums to get what they want, etc. They are extremely overactive, never able to feel they have satisfied their drive for over-activity and settle down to constructive patterns or social behavior. They are absolutely without any sense of right or wrong, breaking up things, abusing the rights of others and, later, satisfying sexual drives at the infantile level. They find it hard to adjust to a school program or work program. Especially, there is no one in the world they care for and they cannot learn to care for anyone because they have never learned to love an affectionate mother in infancy."

Clock-work schedules are very fine for babies, Dr. Bender explains. Babies are happier when the natural rhythms of their bodies are matched by an orderly regime.

But don't treat the baby as a machine. Don't leave him alone with an inanimate bottle for sole comfort. Babies can be lonely and frightened. They need constant companionship, reassurance, and love.

Science News Letter, July 29, 1939

ASTRONOMY

Bright Planets

Mars, At Its Brightest in July, Will Still Be Glorious And Jupiter Will Gain in Brilliance During August

By JAMES STOKLEY

ORDINARILY the evening skies of summer show a different kind of beauty from those of winter, when the brightest stars in the heavens are shining in all their glory. But in August two planets, about at their maximum brightness, join with the usual stars to make glorious the dome of night.

To the south, in Sagittarius, the archer, can be seen the planet Mars, brilliantly red in color. On the first of the month it is brighter than any other planet or star and this makes it easy to find. Rapidly receding from the earth, it will be only about half as brilliant at the end of the month, though even then it will exceed in grandeur any of the stars.

The other planet, slightly inferior to Mars on August 1, but more brilliant later in the month, is Jupiter, which is in the figure of Pisces, the fishes, in the southeastern sky. As it is approaching the earth, it is waxing in brightness, and on the 31st of the month will actually be a little brighter than on the first.

Both of these planets are shown on the accompanying maps, which show the sky's appearance at 11:00 p. m., eastern daylight saving time, on August 1 and at 10:00 p. m., on the 15th. A third planet is visible later in the evening, for, at the start of the month, Saturn, in the constellation of Aries, the ram, rises to the southeast just before midnight. By the end of the month it will be visible in that direction two hours earlier.

Vega Brightest

On the maps we also find shown the positions of the stars, the distant suns which, shining by their own glow, are so different from the planets, whose illumination is the sun of our own solar system. Vega in Lyra, the lyre, is the brightest of these, a little to the west of the point directly overhead. Right at the zenith is Cygnus, the swan, with first magnitude Deneb. High in the south, easily identified because it has a fainter star just above and another just below, is Altair, of Aquila, the eagle.

Arcturus, in Bootes, the bear-driver, is low in the northwest, now about to vanish from the evening sky. As if to take its place, a star that is conspicuous during the winter evenings, Capella, of Auriga, the charioteer, has become visible low in the northeast.

The great dipper, of Ursa Major, the great bear, is in a rather poor position now, because it is so low in the north, but the M-shaped figure of Cassiopeia, the queen, is rising into the northeast. Another well-known figure, that will continue in view during autumn evenings, is the "great square of Pegasus," made of four stars, three of which are in the group of Pegasus, the winged horse, while the fourth is in Andromeda, the chained princess.

The planet Venus, which has been visible in the east just before sunrise is now entirely out of sight. Mercury, however, will be seen in that position for a few days about August 28.

Now Receding

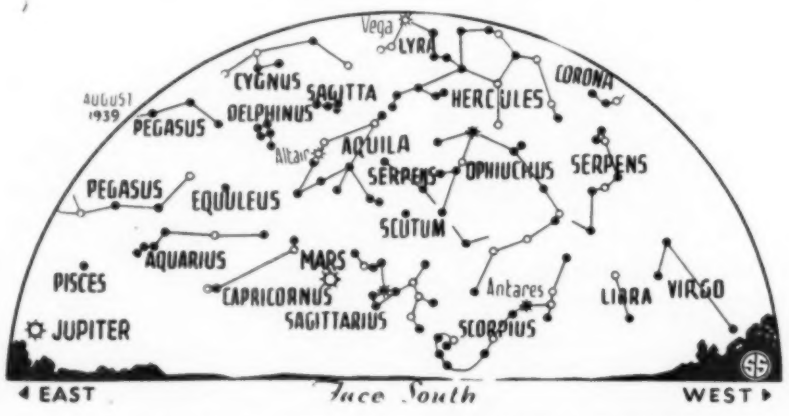
On the 27th of July the planet Mars was but 36,030,000 miles away, closer than it had been since 1924 (See *SNL*, July 22). Now it is receding from the earth, but during August it will still be unusually near. On August 1 its distance is 36,100,000 miles, while on the 31st it will be 42,800,000 miles. Its proximity is what makes it so brilliant. For the same reason, the astronomers who have been carefully studying the planet since the beginning of the summer still have their telescopes trained on it.

The motion of Mars through the sky during August will be of interest. By noticing its position night after night against the background of distant stars, it will at first seem to be moving in a westerly direction. But after August 24 it will seem to be moving to the east. This motion is termed "direct" while that to the west is called "retrograde." Actually, however, the planet is moving steadily around the sun, like the other planets, and in an easterly way. But the earth is also a planet, and is moving similarly, though faster.

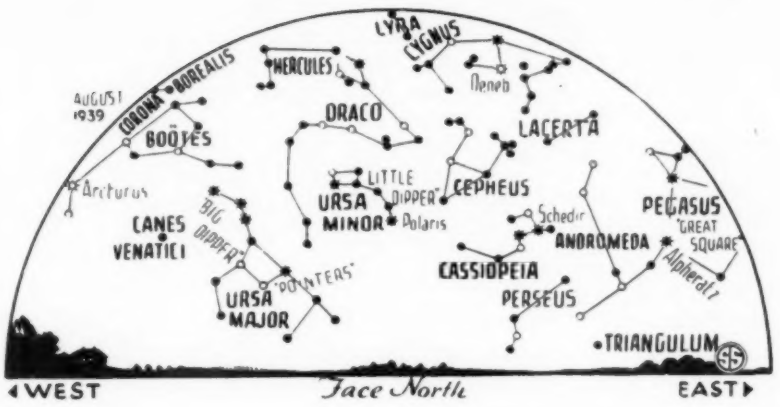
Appears To Be Backing

The speed of Mars is about 15 miles a second, that of the earth 18.5 miles per second. When, as it was the case recently, the two are on the same side of the sun, we overtake Mars, and then it seems to be going backwards. The effect is similar to that which one often observes from an express train when it goes by a slow freight on the next track. Even though express and freight are both going the same way, the latter, as seen from the former, seems to be backing.

Incidentally, the good display of two bright planets in the evening sky now gives a foretaste of what is coming during the fall and winter, a program which will be most interesting to watch. Jupiter and Mars will remain in the evening sky for the coming months, to be joined by Saturn, then later by Venus, and finally by Mercury. Next February, about the second of the month, will come an extremely unusual spectacle. All these five naked eye planets will be lined up in the western evening sky at the same time, like bright beads threaded on a



SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



string. So if you get acquainted with those now visible, you will be better able to enjoy their brothers and sisters as they come into view.

Celestial Time Table for August

Tuesday, August 1, 7:00 p. m., Moon farthest away, distance 252,400 miles. **Saturday, August 5,** 8:46 a. m., Moon passes Jupiter. **Monday, August 7,** 4:01 a. m., Moon passes Saturn. **Tuesday, August 8,** 4:18 a. m., Moon at last quarter. **Friday, August 11,** early a. m., Perseid meteor shower seen at best. **Monday, August 14,** 10:53 p. m., New moon. **Tuesday, August 15,** 3:00 a. m., Moon nearest, distance 222,000 miles. **Monday, August 21,** 4:21 p. m., Moon at first quarter. **Saturday, August 26,** 9:02 a. m., Moon passes Mars. **Monday, August 28,** 2:00 a. m., Mercury farthest west of sun, visible as morning star; 10:00 p. m., Moon farthest, distance 252,500 miles. **Tuesday, August 29,** 5:09 p. m., Full moon.

Science News Letter, July 29, 1939

PHYSIOLOGY

Ten B Vitamins Now Reported And More May Be Discovered

How Many and Which Are Essential in the Human Diet Has Not Been Settled, But Ordinary Diet Supplies All

VITAMIN B has now been chemically sliced into 10 different vitamins or factors and the end is not yet in sight, Prof. C. A. Elvehjem, of the University of Wisconsin, discoverer of pellagra-curing nicotinic acid, the third B vitamin, told a chemical research conference at Gibson Island, Md.

"The boundaries of the B complex are still unknown," Prof. Elvehjem declared. The B complex is "the group of water-soluble vitamins found in yeast." Liver and whole grains are also richly supplied with this vitamin.

Oldest of the B vitamins is the chemical now known as thiamin, which prevents and cures the nerve disorder, beriberi. Next in line is riboflavin, recently discovered to be essential for human health but known much longer as one of the B vitamins through discoveries of the dire effects on laboratory animals of a lack of this substance.

Nicotinic acid, preventive and cure for pellagra, was the third B vitamin to be cut out of the group by chemical dissection.

The spectacled eye factor is the picturesque way Prof. Elvehjem described one of the newest members of the B group. Rats lacking this vitamin develop the condition described as spectacled eyes.

Pantothenic acid, acclaimed recently as a vitamin essential for all living forms, is the same vitamin that prevents a skin disorder in chicks, Prof. Elvehjem said.

The anti-gray hair member of the B group is apparently a rat vitamin only. Another rat vitamin is B_6, also called Factor 1, and fortunately is now identified chemically and available in synthetic form. The chemical identification is fortunate because it helps to clear up some of the confusion about these vitamins.

Factor W, for rats, and Factor U, for chicks, and another substance known at present as vitamin M, apparently complete the list of the 10 B vitamins so far known.

How many and which of them, outside of thiamin, riboflavin and nicotinic acid, are essential in the diet of humans has not been entirely settled. The difficulties of chemical separation of the B vitamins from each other suggests that people eating plenty of food sources such as whole grains, liver and other fresh meat, and yeast, cannot fail to get all of the B vitamins.

The members of the group already available as chemical substances, thiamin and nicotinic acid, for example, are valuable for patients too sick to eat and assimilate the vitamin-containing foods.

Science News Letter, July 29, 1939

BIOLOGY

Sex Hormones from Bees May Affect Vertebrates

NEW evidence that biologically "we are all members one of another" comes out of the beehive. What seems to be a female sex hormone, or gland secretion that powerfully influences the development of the reproductive capacity, produced by worker bees, has been shown capable of effects in animals so remote from the bee world as rats, and therefore presumably on other mammals as well.

The evidence is reported by Dr. Henry L. Heyl of The Children's Hospital, Boston. He found that a chemically prepared extract of royal jelly, the special food given only to bee larvae destined to become queens, when injected into the bodies of immature female rats caused a precocious development of the tissues of their ovaries directly surrounding the egg cells.

Royal jelly is a most peculiar stuff. It is secreted in glands in the mouth of the worker bee. Fed to female bee larvae in a still-undifferentiated state, it causes them to mature rapidly and become full-fledged females or queens, with functional reproductive glands. The other female larvae, comprising the vast majority of the brood, receive royal jelly for only the first three days and develop into workers, which are female insects with undeveloped ovaries and under ordinary circumstances incapable of producing eggs.

Although the royal jelly confers upon the queen bee the power to become the mother of the hive, it does not seem to carry with it the gift of the so-called maternal instinct. Says Dr. Heyl, "The worker exhibits many maternal instincts, the queen none." These insect spinsters not only serve as nurses for the offspring of their larger, fruitful sister; they even produce the wonder-food

that makes queens of some of her daughters, though they receive no benefit of it themselves.

This apparent production by bees of a hormone that can influence the development of mammals and other vertebrates is a new piece in a modern biological puzzle that becomes increasingly complex. Female animals produce male hormones, male animals produce female hormones, and animal hormones characteristic of both sexes have been found in plants, even in some of the lowest forms. Physiologists still have a lot of explaining to do.

Science News Letter, July 29, 1939

ARCHAEOLOGY

More Than 50 Expeditions Will Uncover American Past

Archaeologists Plan Busy Summer With Pick and Shovel; Nearly Another 50 Parties Will Explore Foreign Sites

By EMILY C. DAVIS

SEE ancient America first!

This is the present American trend in the big scientific adventure of digging up prehistory. Out of nearly 100 American archaeology expeditions taking the field this summer, more than 50 will make the dirt fly within the states.

A current slump in American eagerness to explore foreign lost kingdoms and buried civilizations is partly due to economic considerations. Long-distance expeditions are costly. Partly, too, there is a canny desire to skirt around international danger zones.

But there is no slump in digging up ancient America. The Indian panorama, which left its mark on our roads, agriculture and other highly important developments, is being unearthed at unprecedented speed.

Partly responsible for the attack on American prehistory on so many fronts —that is to say, in so many of the states —is the WPA program, financing 32 of the archaeological expeditions, in 22 states. In each project the government provides the labor, giving 2,500 men and women work. A museum, university, or scientific institution sponsors each expedition, and supplies archaeologists to direct it.

May Find Men

This summer of 1939 may prove the big year revealing the long-sought men who first took America. The trail of their weapons and bones of great beasts they slew have tantalized archaeologists long enough. They are increasingly eager to find bony remnants of the hunters themselves. Modern America would like to meet personally the first inhabitants, who apparently came before the last Ice Age ended, a good many thousand years ago.

The only archaeologist that the Smithsonian Institution in Washington is sending out to dig, this summer, will pursue the manhunt for the missing Folsom hunters. Digging in Colorado, at the one known campsite of Folsom Man thus far discovered, Dr. Frank H. H. Roberts, Jr., of the Smithsonian, has in previous seasons found a variety of their stone tools and the red paint they used for art, as well as dinner remains and the debris of their tool-making. All this provides the most varied picture of the mystery man yet unearthed, and Dr. Roberts still hopes that, if any of the hunters were unlucky enough to die while camping at this place, he may have the luck to find the bones.

Cooperative Venture

Meanwhile, a hunt for Folsom Man's remains and relics is being organized into a cooperative venture under WPA auspices in universities in Montana, Wyoming, and neighboring states. By pooling resources and knowledge, these searchers expect to make greater progress than would be possible alone, in tracing routes and experiences of the earliest immigrants who came via the Siberian-Alaskan route to live in the New World. There is even the possibility of detecting earlier and still more shadowy arrivals than the Folsom hunters, judging by recent findings in California of more primitive and apparently more ancient tools than Folsom Man's own.

Bestirred by the building of the dams in the Tennessee Valley and other regions, archaeologists are now working against time to rescue relics of the past buried in each new era marked for inundation. Indian mounds and settlements are now being explored in Texas and the TVA area where landscape will soon become a lake bottom, lost forever for further investigation.

Many of the shell ornaments and Indian belongings coming to light in Alabama mounds, in this race to rescue prehistory, are providing valuable missing links in the story of the Southeast. They may eventually show what was the connection, centuries ago, between centers of high Indian culture in the Mississippi Valley and those in the deep south.

To study a little-known type of Indian life that throve in the Southwest over a thousand years ago, three different museums are sending out expeditions. The Mogollon culture is the name archaeologists have bestowed on this distinctive pattern of Indian life, detected by some of its relics.

Study Mogollon Culture

The only archaeological expedition sent out by the Field Museum of Natural History this summer will investigate this Mogollon culture in New Mexico. Digging in early ruins near Glenwood, the explorers hope to find out whether the little-known Mogollons had anything to do with the well-known Basket Maker Indians who made homes in the Southwest in centuries around the turn of the Christian era.

At another ruin not far away the same Mogollon Indians will be investigated by scientists of the Logan Museum of Beloit College, with the idea that these elusive ancients might have some connection with Pueblo Indians, who succeeded the Basket Makers.

In Arizona, south of Showlow, a Mogollon village occupied apparently about 700 or 800 A. D. will be explored by the Arizona State Museum, for any light on these Indians and their role in America's past.

Confident that they can actually date prehistoric events in the middle west, archaeologists of the University of Chicago are now putting final touches on two master charts of tree rings. These charts, which have been built up by matching and overlapping older and older series of annual growth rings formed in midwestern trees, can be linked with calendar dates in which distinctive series of rings formed. Like the tree-ring calendar which has restored to Southwestern pueblos and cliff-dwellings their "ages," the two new tree-ring calendars will help date events in the lives of the Mound Builders in the northern

IN THE SOUTHWEST

A number of expeditions are probing America's past in this region. Chaco Canyon, New Mexico, typical Southwestern scene of ruins and rocks, is getting some repair work done. Ancient Indian walls are being propped up for safety.

Mississippi Valley and the central area, including northern Georgia and eastern Oklahoma.

Midwestern tree rings are telling tales of ancient America's economic worries. Both oak and pine trees of Tennessee and southeastern Missouri indicate severe droughts between 1684 and 1708, and between 1725 and 1738, the research reveals. These times of dryness, it is believed, must have caused great privation to the Indians, and there must have been considerable moving of the population to escape it.

American luck at striking archaeological treasure abroad starts out well, this year of 1939.

Discovery of a palace in Greece, right out of Homer's "Odyssey," is already announced, and also new light on King Solomon's "Pittsburgh" by the Red Sea.

In Athens, for the ninth season, Americans are persistently clearing the famous Agora, or market place. The greater part of the market place is now cleared. Many public buildings have been identified, providing thrills for the discoverers who are the first moderns to see these forgotten scenes out of Greek history.

But still sculptures, inscriptions, and building ruins continue to be uncovered in the famous Agora. An early discovery this year is the great drain of the market area. Unused since 86 B. C., apparently, it is being cleared and will again carry rain water off the site.

Antioch, which rated as one of the "big four" cities of the early Christian era, is another scene for 1939 discoveries. In 1932, American and French institutions banded to work together, to unearth this famous city in Syria, giving themselves five summers for the work. But buried Antioch has proved far richer in ruins and history than they expected.

In this ancient Antioch, where St. Paul walked and Christian history was made amid scenes of extravagant luxury and beauty, archaeologists are now seeking the Forum of Valens. They hope to identify it, and the buildings nearby and the main cross street. They are digging also at the suburban Daphne, and in a third century villa they have already found such art objects as silver vessels, a statuette of Hera, and mosaics that were a favorite decoration of Antioch's wealthy homes. Later in the season, the searching will be transferred to Antioch's ancient port, where for two years they have been bringing to light the markets, shops and docks of a great city's sea trading.

Archaeologists boldly declare that the Greek world is still far from fully revealed, and so long as they can make discoveries such as Nestor's Palace, unearthed this spring, the claim will stand undisputed. This palace, in which the wise Nestor of Homer's tales welcomed and counseled the Greeks, turns out to be a large residence facing the Ionian Sea.

But for Prof. Carl Blegen of the University of Cincinnati, who found it while working with the director of the Greek National Museum, the Palace of Nestor is far more than an impressive home, with strong stone walls and spacious painted walls. For in a small room in the palace, the discoverers encountered stacks of hundreds of archives written on clay.

Bookkeeping Records

Here, for the first time, is writing by the Greeks of Homer's age. Their script proves to be borrowed directly from the isle of Crete. The tablets resemble those found in Crete. Those first examined are mainly bookkeeping records, long lists of goods and men. The writing of early Greece, like that of Crete, becomes one more problem for scholars to solve. A few signs can be deciphered; otherwise this kind of script is still unreadable.

At Ezion Geber, where last year Dr. Nelson Glueck found King Solomon's seaport, he has resumed digging and has already announced finds. It is clear now that the ambitious King Solomon built this industrial and shipping town from the ground up. Thousands of laborers worked on it, and the brick walls after 3,000 years are still in many places standing almost to original height.

Here were great smelting and refining plants working the copper and iron brought from mines not far away. The metal goods, as archaeologists can readily see, were economically handled in this way, for Ezion Geber was well located. From it Solomon's own ships sailed down the Red Sea carrying trade goods, to exchange for the always desirable gold and ivory, spices and fine woods of Africa and the east.

The American School of Oriental Research, in Jerusalem, which is exploring Solomon's port, is one of the few agencies now trying to work in the neighborhood of Palestine. Solomon's port is east

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of Palestine, and Transjordan has heretofore been unaffected by Arab uprisings. But when sudden disturbances broke out east of the Jordan in March, British officials held up permission for digging at the Solomon port. For a time, all Prof. Glueck's arrangements for convoys, camps, and supplies seemed likely to end in no expedition at all.

Strife in Palestine has not stopped the digging at the place most closely associated with wars—ancient Armageddon. The Oriental Institute of the University of Chicago has just finished six months work there, though the road from Megiddo—as it is called today—to Jerusalem is traveled only when armored cars lead and follow private automobiles that travel the highway. On the last day of digging, an ivory "protective instrument" belonging to a woman of 1400 B. C. was found.

Before summer is over, Americans may be telling of discoveries in Iran, in Turkey at the site of ancient Van, in Cyprus, Egypt, Bulgaria, to name other regions where archaeological news may break, in the determined search for the forgotten past.

Science News Letter, July 29, 1939

The exact tone required for automobile horns is specified in Argentina.

The Chinese 4,000 years ago realized that goiter generally attacked people who lived inland, and they treated it with seaweed and other sea medicines many of which contained the helpful iodine.

● Earth Trembles

Information collected by Science Service from seismological observatories and relayed to the Jesuit Seismological Association resulted in the location of the following preliminary epicenter:

Monday, July 17, 10:26.6 p.m., EST

In North Pacific Ocean, 300 miles west northwest of Vancouver, B. C. Latitude 49 degrees north. Longitude 130 degrees west.

For stations cooperating with Science Service in reporting earthquakes recorded on their seismographs see SNL, June 17.

AERONAUTICS

New Air Route May Link Philippines and East Indies

Airway Would Have Terminals in Manila and Batavia, Capital of Java; Political Complications Considered

A SERIES of agreements under which a new air route linking the Philippines and the Netherlands East Indies would be operated by Pan American Airways and K.L.M., the Royal Dutch Air Lines, is expected to be successfully negotiated during the next few months.

Termini of the airway would be Manila and Batavia, prosperous capital of the island of Java. Several alternative routes could be flown. To Pan American, the line would represent a further extension of its transpacific service, which now goes to Hong Kong. To K.L.M., it would be a side branch of their Amsterdam to Australia run, which goes to Sydney, Australia, via Penang and Port Darwin.

Considerable difference of opinion about the wisdom of admitting the Dutch to Manila exists in Federal government circles, but necessary landing rights will be granted, it is understood, with the proviso that an American concern be entitled to operate into the East Indies. Political complications brought about partly by coming Philippine independence are feared by those opposing the grant.

If Pan American and K.L.M., whose full name is Koninklijke Luchtvaart Maatschappij voor Nederland en Kolonien, thus connect, it will be possible to fly around the entire world in American airplanes, as K.L.M. has long used American ships exclusively.

Pan American expansion plans actually under way feature a route from San Francisco to New Zealand via Honolulu. A U. S.-Australia line, which might be an extension of the present transpacific service, has also been discussed by Pan American officials, as has a U. S. operated link between Australia and New Zealand across the Tasman Sea. The proposed Manila-Batavia service could fit into the Australian route as the direct flight passes over a group of colonial islands which would not provide profitable stopping points. Imperial Airways is about to launch New Zealand-Australia service.

The proposed route to Batavia, which might stop over at Saigon, capital of French Indo-China, landing rights at which the French would probably grant upon request, brings up the vision of a round-the-world airline entirely under the American flag. Pan American, whose lines stretch from Hong Kong to Marseilles via the United States, already spans a larger portion of the earth's earth's surface than any other commercial air company.

The agreements necessary before the Manila-Batavia line could become a reality include landing rights for the Dutch at Manila and for an American company at Batavia, and for intermediate points as well. An agreement between Pan American and K.L.M. on operating questions might also be necessary. A Panam official has already stated that needed airplanes and other equipment are available.

Science News Letter, July 29, 1939

PHYSICS

Molecular Activity Likened To Mountainous Terrain

IF YOU think of chemical molecules as having "populations" of atoms, you can picture chemical reactions between molecules as the interchange of various members of these populations. These interchanges are accomplished over a barrier of electrical force between molecules which can be likened to a mountain range between two valleys in which the atom populations dwell.

Prof. Victor K. LaMer of Columbia

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University points out that physical chemists today represent their energy relations between molecules by energy diagrams which resemble the contour maps of a mountainous country.

He adds that the interchanges in the population of people separated by a mountain range are determined by the number of people in each community, by the height and character of the roads leading over the mountains and by the mountain climbing ability of the natives.

"The higher the mountain pass, which is the same thing as saying that the molecules require a large energy of activation to react, the fewer are the interchanges. The more roads that are constructed over the mountain pass the more easily it can be traversed."

Until recently chemistry's only way of getting "over the mountain" was to make the molecules energetic by heating them, or to prevent them from reacting by cooling them, Prof. LaMer states.

New knowledge of the role of chemical catalysts is, however, showing that molecules can be drawn together (overcome the barrier wall between them) by the presence of electrical charges on the catalysts. Thus two molecules having positive electric charges dislike to react because the like charges repel one another. If a catalyst with a negative charge is placed near them the attractive force helps bring the two incompatibles together and may make them react.

Catalysts, in effect, provide new "pathways" across the barrier "mountains" among molecules. "Definite proof of the existence of this new kind of 'mountain pass' will have its applications throughout the whole of the chemical world," Prof. LaMer states.

Science News Letter, July 29, 1939

PHYSIOLOGY

Window Lets Scientists Look Into Chest

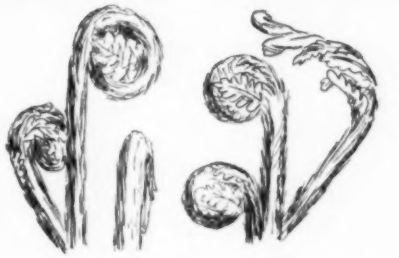
A GLASS window in the chest which lets the scientist look inside and observe the lungs as they breathe air in and out has been devised by Dr. Robert J. Terry of Washington University at St. Louis. A moving picture has been made through the window and in describing the construction of the window (*Science,* July 14) Dr. Terry promises reports of studies made through the window.

Science News Letter, July 29, 1939

The Pacific Ocean covers more area than all the earth's land put together.

PHYSIOLOGY

NATURE RAMBLINGS
by Frank Thone



Spirals in Nature

THE SPIRAL is one of the commonest patterns in living nature. It seems to be one of the easiest outlines for life to trace.

Familiar examples will occur to any one almost instantly: snailshells, the way water whirls in an eddy, the twining of a beanstalk around its support. So striking is the pattern of the first of these examples that the Greek word for a snail, *Helix,* means a spiral.

A very little additional searching will disclose the pattern, existing everywhere under the thinnest of disguises. What seem to be the concentric rings of thread in an orb-weaving spider's web are really spirals, starting at the center and gradually widening toward the outside. As a rule the spider spins two such spirals for the web, completing one and then returning to the center to start another.

Almost all common plants have the spiral pattern worked into their bodies in one place or another. Take a twig of a tree, like elm or apple. Trace a line on its bark from one leaf to the one next above it, then to the one above that, and so on. You will find you are working around the twig, in a spiral. The uncurling "fiddlehead" of a young fern leaf is another familiar plant spiral.

Watch a soaring bird, like a hawk or a buzzard, as it sails around in the air watching something below that interests it—usually a possible source of a meal. We commonly say that the bird is "circling"; but if you will wait longer and watch carefully you will see that it is really tracing a wide spiral path through the air.

The spiral seems to be the basic pattern of the universe itself, for we have learned in recent years that the marvelous astronomical patterns called spiral nebulae are really vast aggregations of stars, millions of suns like our own, or even larger, rotating around a common center in a vast spiral dance.

The earth and all the planets, as they move about the sun, trace spirals. True, it is commonly stated for convenience that the planets revolve around the sun in elliptical paths. But the sun also is moving, so that when a planet gets to the end of its annual ellipse, it is millions of miles from where it started. The ellipse has been broken open and pulled apart—into a spiral!

Science News Letter, July 29, 1939

BIOLOGY

Findings May Speed Making of Fat From Sugar

A PRACTICAL way of causing yeast cells to manufacture fat from sugar and other carbohydrates may be brought closer to realization by experiments reported by Dr. Theodore J. B. Stier of Harvard's Biological Laboratories.

Knowledge of the intracellular processes of human tissues may also be advanced markedly as a result of his studies on the allied cell-life of baker's yeast.

Particularly significant is his finding that yeasts deficient in vitamin B fall behind in production and storage of animal starch or glycogen. The tests reported are the first ever made in which yeast cells have been kept in an alcohol or sugar bath of constant concentration, an important factor if any implications are to be drawn for the animal cell.

The research dealt quantitatively with the diet of yeast cells and their manufacture of glycogen and fat. For this reason it may also help future perfection of a yeast process for making fats, first utilized by Germany during the World War.

Dr. Stier has confirmed previous findings that yeast forms fat when fed sugar or alcohol. He found that alcohol aids conversion of its stored carbohydrate to fat and that more fat is stored on a diet of both alcohol and sugar. Yeast without food or oxygen goes into suspended animation. This discovery may permit storage of yeast.

He found that the concentration of vitamin B falls if yeast is deprived of food but not oxygen. Ability to produce this deficiency may be useful experimentally. Starved yeast cells fed glucose but no oxygen, store glycogen and produce much alcohol but little fat.

On glucose plus oxygen, deficient yeast makes glycogen but a short time, whereas normal yeast on this diet continues faster production longer.

Science News Letter, July 29, 1939

First Glances at New Books

Medicine—Home Economics

RECIPES AND MENUS FOR ALLERGICS—Myra May Haas and Nathan Schaffer—*Dodd, Mead,* 250 p., $2.50. Patients with food allergies will be glad to have the recipes and menu suggestions in this book, but it is advisable to use it under the direction of one's physician who may find reasons why the patient should not follow some of the recipes.

Science News Letter, July 29, 1939

Medicine

CANCER HANDBOOK OF THE TUMOR CLINIC, STANFORD UNIVERSITY, SCHOOL OF MEDICINE—Eric Liljencrantz, ed.—*Stanford Univ. Press,* 114 p., $3. Designed for medical practitioners and graduate students.

Science News Letter, July 29, 1939

Anatomy

PRINCIPLES OF HUMAN ANATOMY—Charles F. DeGaris, Ernst Lachmann and Ralph E. Chase—*Lea & Febiger,* 239 p., $2.50. This text for medical students is the first detailed published account of the teaching methods used by two famous American professors of anatomy, the late Dr. F. P. Mall and Dr. L. H. Weed of the Johns Hopkins Medical School. The authors of the book, now at the University of Oklahoma School of Medicine, have added some specialized material, synopses and a bibliography.

Science News Letter, July 29, 1939

General Science

THE NEW INTERNATIONAL YEAR BOOK, 1938—Edited by Frank H. Vizetelly and Charles Earle Funk—*Funk & Wagnalls,* 799 p., $6.25. An essential reference annual that brings together facts and information promptly and in adequate detail.

Science News Letter, July 29, 1939

Zoology

BIOLOGY OF THE VERTEBRATES (Rev. ed.)—Herbert Eugene Walter—*Macmillan,* 882 p., $4. A new and revised edition of a thorough-going text for use in premedical and other advanced undergraduate courses in zoology.

Science News Letter, July 29, 1939

Mathematics

FOUNDATIONS OF LOGIC AND MATHEMATICS—Rudolf Carnap—*Univ. of Chicago Press,* 71 p., $1. (International Encyclopedia of Unified Science, Vol. 1, No. 3.) Language is subjected to logical analysis involving semantics and syntax. Language is analyzed according to methods of the calculus and a conclusion is that the physicist, although he cannot give us a translation into everyday language, understands the symbols he uses and the laws of quantum mechanics. He possesses, thus, that kind of understanding which alone is essential in the field of knowledge and science.

Science News Letter, July 29, 1939

Medicine

THE PATIENT IS THE UNIT OF PRACTICE—Duane Willard Propst—*Thomas,* 219 p., $3.50. A brief text designed to help medical students orient the principles of medical practice with the patient as a focal point.

Science News Letter, July 29, 1939

Reference

AMERICAN FOUNDATIONS AND THEIR FIELDS, IV—Geneva Seybold, comp.—*Raymond Rich Associates,* 218 p., $3.75. A valuable survey of 243 foundations, showing capital funds, grants paid, officers and objectives, investments, and a classification of grants made in 1937. This volume continues the Twentieth Century Fund studies of 1930, 1931 and 1934. Total assets are over $950,000,000 and total annual expenditures close to $50,000,000.

Science News Letter, July 29, 1939

General Science

A CENTURY OF SOCIAL THOUGHT, A Series of Lectures Delivered at Duke University—*Duke Univ. Press,* 172 p., $2. Centennial celebration lectures by Charles H. Judd on education, Harold G. Moulton on economics, Henry Sloane Coffin on religion, John C. Merriam on science, Pitirim Alexandrovitch Sorokin on socio-cultural trends, Robert Moses on planning, Roscoe Pound on juristic thinking.

Science News Letter, July 29, 1939

General Science

MAGNES ANNIVERSARY BOOK; Contributions by members of the academic staff of the Hebrew University—Ed. by F. I. Baer, F. S. Bodenheimer, J. N. Epstein, M. Fekete, A. Foder, I. J. Kligler and L. A. Mayer, 535 p., *limited number of copies available to educational institutions, libraries, etc., from American Friends of the Hebrew University, Inc., 10 E. 40th St., New York, N. Y.* A memorial volume, issued on the occasion of the sixtieth birthday of the president-builder of the Hebrew University on Mount Scopus in Jerusalem. There are numerous articles covering a wide range in the sciences; main texts are in Hebrew, with English summaries.

Science News Letter, July 29, 1939

Biology

A NEW DICROCOELIID TREMATODE COLLECTED ON THE PRESIDENTIAL CRUISE OF 1938—Allen McIntosh—*Smithsonian Inst.,* 22 p., 5c.

THE POLYCHAETOUS ANNELIDS COLLECTED ON THE PRESIDENTIAL CRUISE OF 1938 — Olga Hartman — *Smithsonian Inst.,* 2 p., 10c.

DECAPOD AND OTHER CRUSTACEA COLLECTED ON THE PRESIDENTIAL CRUISE OF 1938—Waldo L. Schmitt — *Smithsonian Inst.,* 29 p., 20c.

Science News Letter, July 29, 1939

Medicine

WHAT IT MEANS TO BE A DOCTOR—Dwight Anderson—*Med. Soc. of the State of N. Y.,* 96 p., $1. A short description of the training for medicine, the practice of medicine and the medical societies forms a background and vehicle for the author's denunciation of socialized medicine.

Science News Letter, July 29, 1939

Bibliography

THE ANAEROBIC BACTERIA AND THEIR ACTIVITIES IN NATURE AND DISEASE. Vol. I, Chronological Author Index, 295 p.; Vol. II, Subject Index, 602 p.—Elizabeth McCoy and L. S. McClung—*Univ. of California Press,* $10. A bibliography of over 10,000 original articles and reports, which should be useful to workers in the field.

Science News Letter, July 29, 1939

Medicine

THE CLINICAL AND EXPERIMENTAL USE OF SULFANILAMIDE, SULFAPYRIDINE AND ALLIED COMPOUNDS — Perrin H. Long and Eleanor A. Bliss—*Macmillan,* 319 p., $3.50. See page 70.

Science News Letter, July 29, 1939

Political Science

DEMOCRACY HAS ROOTS—M. L. Wilson—*Carrick & Evans,* 199 p., $1.75. A book by the Under Secretary of Agriculture on political theory with special reference to agricultural problems. It is built out of material presented in lectures at the U. S. Department of Agriculture by a number of leading economists and publicists, and is a definitive expression of a particular school of social and economic thought.

Science News Letter, July 29, 1939

Child Study

PROCEEDINGS THIRD BIENNIAL MEETING—Society for Research in Child Development—*National Research Council,* 131 p., $1.

Science News Letter, July 29, 1939